

Serial No. 10/080,568
Docket No. YOR919980324US2

2

AMENDMENTS TO THE CLAIMS:

Claims 1-10 (Canceled)

Claim 11. (Currently amended) An array of microelectronic elements comprising:

- a substrate of semiconductor material;
- a lower layer of dielectric material disposed with a lower surface in contact with said substrate and an upper surface in spaced adjacency thereto;
- a pattern of mutually electrically isolated conducting regions disposed within said lower layer of dielectric material, said conducting regions extending to said upper surface of said lower layer;
- an upper layer of dielectric material disposed with a lower surface thereof in contact with and bonded to said upper surface of said lower layer; and
- a plurality of nodes of semiconductor material disposed within said upper layer of dielectric material, each of said nodes being in electrical contact with only one of said conducting regions at said upper surface of said lower layer,

wherein each conducting region comprises:

- a metal conductor; and
- a ~~via formed on said metal conductor and~~ comprising a diffusion barrier material, said diffusion barrier material extending between said metal conductor and ~~which contacts~~ a node in said plurality of nodes and electrically connecting ~~connects~~ said metal conductor with said node.

Claim 12. (Previously presented) An array as set forth in claim 11, wherein each of said nodes comprises a semiconductor device.

Claim 13. (Previously presented) An array as set forth in claim 11, wherein said semiconductor material comprises oriented single crystal grain, monocrystalline semiconductor material, and each of said nodes comprises a diode.

Claim 14. (Original) An array as set forth in claim 13, wherein said microelectronic elements comprise magnetoresistive memory elements each comprising a said diode and an

Serial No. 10/080,568
Docket No. YOR919980324US2

3

MTJ structure.

Claim 15. (Previously presented) An array as set forth in claim 12, wherein said semiconductor device comprises a field effect transistor.

Claim 16. (Previously presented) An array as set forth in claim 15, wherein a first insulating layer is disposed over an upper surface of said upper layer and a second insulating layer is formed over said upper surface of said lower layer.

Claim 17. (Previously presented) An array as set forth in claim 13, wherein said oriented single crystal grain semiconductor material is oriented in the <100> orientation.

Claim 18. (Previously presented) An array as set forth in claim 11, wherein said electrically conducting material comprises at least one of W, Ti, and Ta.

Claims 19-25 (Canceled)

Claim 26. (Previously presented) A microelectronic element array comprising:
a semiconductor substrate;
a first dielectric layer formed on said substrate;
a plurality of electrically isolated conductive regions disposed within said first dielectric layer, each conductive region comprising:
a metal conductor; and
a conductive via comprising a diffusion barrier material formed on said metal conductor;
a second dielectric layer having a lower surface which is bonded to an upper surface of said first dielectric layer; and
a plurality of semiconductor nodes formed in said second dielectric layer, each semiconductor node contacting said conductive via and being electrically connected to said metal conductor by said conductive via,

wherein said diffusion barrier material extends between said metal conductor and a

Serial No. 10/080,568
Docket No. YOR919980324US2

4

node in said plurality of nodes.

Claim 27. (Previously presented) The array according to claim 26, wherein said plurality of semiconductor nodes comprises a plurality of monocrystalline semiconductor diodes.

Claim 28. (Previously presented) The array according to claim 26, wherein each conductive region extends from said substrate to said upper surface of said first dielectric layer.

Claim 29. (Previously presented) The array according to claim 26, wherein each conductive region further comprises a word line, said via being formed on said word line.

Claim 30. (Previously presented) The array according to claim 27, further comprising:
a plurality of magnetic tunnel junction (MTJ) elements, each MTJ element in electrical contact with a diode in said plurality of monocrystalline semiconductor diodes.

Claim 31. (Previously presented) The array according to claim 30, wherein each said MTJ element and each said diode combine to form a memory element.

Claim 32. (Previously presented) The array according to claim ~~38~~ 26, further comprising:
at least one a plurality of field effect transistor transistors, said at least one each node
~~in said plurality of semiconductor node nodes~~ forming a part of said at least one each field
effect transistor.

Claim 33. (Previously presented) The array according to claim 26, wherein said via includes therein at least one of W, Ti, and Ta.

Claim 34. (Previously presented) The array according to claim 26, wherein each said conductive region further comprises a metal layer in electrical contact with said via, said metal layer being formed of a different material than said via.

Serial No. 10/080,568
Docket No. YOR919980324US2

5

Claim 35. (Previously presented) The array according to claim 29, wherein said via includes therein a refractory metal and said work line comprises one of copper and aluminum.

Claim 36. (New) The array as set forth in claim 11, further comprising:
a bonding promoting layer formed on said lower layer of dielectric material, said bonding promoting layer bonding said lower surface of said upper layer of dielectric material to said upper surface of said lower layer.

Claim 37. (New) The array as set forth in claim 36, wherein said bonding promoting layer comprises a glass layer having a softening temperature in a range of 400°C to 500°C.

Claim 38. (New) A microelectronic element array comprising:
a first dielectric layer formed on a substrate;
at least one electrically isolated conductive region formed in said first dielectric layer, said at least one conductive region comprising:
a metal conductor; and
a conductive via comprising a diffusion barrier material formed on said metal conductor;
a second dielectric layer which is bonded to said first dielectric layer; and
at least one semiconductor node formed in said second dielectric layer, said at least one semiconductor node being formed on and contacting said at least one conductive region, wherein said diffusion barrier material extends between said metal conductor and said at least one semiconductor node and electrically connects said metal conductor to said at least one semiconductor node.